Gastroenterology and Hepatology From Bed to Bench.


**ORIGINAL ARTICLE**

# New features of fascioliasis in human and animal infections in Ilam province, Western Iran

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## ABSTRACT

**Aim**: The aim of this study was to investigate the prevalence of human and animal fascioliasis in Ilam Province, Iran.

**Background**: Fascioliasis, caused by *Fasciola hepatica*, is one of the most important zoonotic diseases. Snails are an intermediate host. Human infection with the parasite can led to hypertrophy and hyperplasia in bile duct. It also economic importance and further information is essential about the epidemiology of the parasite in Ilam province.

**Patients and methods**: The study on animals was descriptive and retrospective. All records from abattoirs were analyzed. It was conducted on 27242 indigenous animals including 17055 sheep, 5703 goats, and 4484 cattle. For the study of human Fascioliasis infection 600 human sera, from person among 5-80 year old, were collected and ELISA test was used for identification of IgG antibody to *Fasciola hepatica* by commercial kit.

**Results**: The overall prevalence of *Fasciola hepatica* among 27242 slaughtered animals was 0.98%. Out of 267 domestic animals, 98 sheep, 28 goats and 141 cattle were infected with the parasite. The highest and lowest infection rate of 3.14% and 0.1% were cattle and goat, respectively. The prevalence of IgG antibody was0.66% (n = 4) against *Fasciola hepatica* in humans. Three infected people were living in rural areas. The highest infection rate (3 people) was found in women.

**Conclusion**: Ilam province is among the areas where the prevalence of *Fasciola hepatica* is low. This is probably due to the drought in the region in recent years that makes conditions difficult for the survival of snails, the intermediate hosts. But there is a risk of the disease increasing in incidence, in this region.

**Keywords**: Fascioliasis, Epidemiology, Iran.

**(**Please site as: **Abdi J, Naserifar R, Rostami Nejad M, Mansouri M. New features of fascioliasis in human and animal infections in Ilam province, Western Iran. Gastroenterol Hepatol Bed Bench 2013; 6(3): 152-155**).**

## Introduction

Zoonotic infections can be defined as infections of animals that are naturally transmissible to humans. Fascioliasis, caused by liver fluke species of the genus *Fasciola*, is one of the most neglected diseases that leads to human infection (1).

The World Health Organization reported (WHO, 2012) that the infection is considered a neglected disease and that where animal cases are reported human cases are usually found (2).

Different parts of Iran are considered to be hyper-endemic for human and animal Fascioliasis. New studies have shown human Fascioliasis presents with marked heterogeneity, leading to different epidemiological patterns and transmission patterns in different endemic areas (3, 4).

*Received*: 8 March 2013 *Accepted*: 18 May 2013
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Climatic diversities are particularly important to the development of the snails that act as intermediate hosts for fasciolias is in areas with differing environmental characteristics. Techniques have identified two fasciolias, including *F. hepatica* and *F. gigantica*. It is established that areas with only one *Fasciola* spp. are distinct from local and zonal areas where both fasciolids co-exist (4). Epidemiological analysis of human and animal fascioliasis has been carried out in different parts of the world including Iran and the result of these studies showed that more than 17 million people around the world are infected by F. hepatica and today Fascioliasis is classified as tropical disorder (3-10).

A low prevalence of Fascioliasis have been reported from Corsica (0.8%) and China (0.7%), an intermediate prevalence from Porto (3.2%) followed by Egypt (7.3%), and Peru (8.7%) and a high prevalence from Montero valley and Bolivia with prevalence of 34.2 and 66.7 percent respectively (11).

In different parts of the world, in addition to cattle, sheep and goat and other domestic animals such as pig and donkey are classified as hosts of Fascioliasis and this is the main cause of high prevalence of Fascioliasis in different geographical areas (3) therefore, assessment of the role of determinants responsible for the onset and prevalence of this parasitic disease are needed for various regions.

Although the disease has been reported in humans and animal in many other parts of the world, including several provinces of Iran, it has not been recorded in humans in Ilam. Thus, the objective of this study was to identify the prevalence of Fascioliasis in both human and animals in Ilam province.

## Patients and Methods

**Slaughtered animals survey**

This study was a retrospective survey covering a period of one- year in 2012. The numbers of slaughtered domestic animals during 2012 were: 4484 cattle, 17055 sheep, and 5703 goats. All abattoir records for cattle, sheep and goats were used to evaluate the prevalence of Fascioliasis in the abattoirs of Ilam, a province in Western Iran. The prevalence was collated on a monthly basis.

**Human seroepidemiology survey**

Six hundred patients who were admitted to rural and urban health care centers (300 rural and 300 urban) and were prospectively evaluated for *Fasciola hepatica* infection between January and December 2012. All patients received an initial complete clinical exam, laboratory tests including complete blood counts and routine biochemical analyses. Socio-demographic data including age, residence place, educational level, and socio-economic level were obtained from all participants. For this purpose 5 ml blood samples were collected then centrifuged to separate serum and stored at -20°C in the laboratory of the department of parasitology.

According to the manufacturer's indication, sera of the 600 patients were analyzed for anti-*Fasciola hepatica* IgG antibodies by available commercial Enzyme Linked Immunosorbant Assay kit (ELISA, Pishtaz Teb /Iran).

## Results

A total of 27,242 animals, 4484 (16.5%) cattle, 17055 (62.5%) sheep and 5703 (21%) goats were slaughtered in the period between January and December 2012. From this number 141 (53%) slaughtered cattle, 98 (36.5%) sheep and 28 (10.5%) goats were infected by *Fasciola hepatica*. The overall prevalence of *Fasciola hepatica* in the slaughtered animals was 1 percent (267 cases).

Highest level of contamination was in cattle and goats had lowest infection rate. From the result, we can conclude that cattle are the main host of *F. hepatica* in Ilam province.

*Fasciola hepatica* infection was detected in four patients (0.7%) (Three females, mean age: 30.6 years, range: 5-80 years). Three of them were lived in rural area and just one patient lived in urban area. The results indicated that the rate of infection in women is three times higher than men and the rate of infection is associated with gender and place of residence.

The patients did not have clinical or laboratory findings compatible with extra hepatic biliary obstruction; therefore, these patients were accepted as hepatic phase Fascioliasis.

## Discussion

According to the results of this study, the prevalence of *Fasciola hepatica* in Ilam province is low compared with other parts of Iran (3). The results of serological tests on humans and also slaughtered animals in different provinces of Iran have shown the diverse rates of prevalence of this parasite (12). In the study of human and animal *fasciola* infection from Mazandaran province the prevalence of Fascioliasis for sheep and cattle was 7.3% and 25.4% respectively and between 1999 and 2002, 107 infected cases reported in this region (13, 14). This result shows the higher prevalence of Fascioliasis in this region. Khosravi et al reported a high prevalence of Fascioliasis, in a study conducted between 2007 and 2010 on the slaughtered animals in Ilam (8.48%). By comparing these results to our present study we can conclude that the prevalence of *F.hepatica* has certainly decreased in recent years, probably due to drought leading to unfavorable conditions for snails (15).

In a study conducted in 2001 by Moshfe and his colleagues, the prevalence of *Fasciola hepatica* in slaughtered sheep in Yasuj province was 9.26% (16). Due to climate similarity between these two regions (Ilam and Yasuj), we expected to have the same rate, but this rate was 10 times higher than our results.

In the present study the lowest rate of infection is belonging to goats and this low prevalence may be because of its feeding habits, compared to cattle, or resistance to F. hepatica. The highest rate of infection is belonging to cattle and it seems that cattle play the main reservoir of Fascioliasis transmission in Ilam.

By comparing these studies with the present study, we can conclude that the rate of infection in humans and animals are diverse in different parts of the world and do not follow the same pattern. This dissimilarity is depend on different factors such as region's climate, biological characteristics of snails intermediate hosts, diversity and distribution of reservoir hosts, dietary habits and vegetable consumption. Fascioliasis has recently been classified as a newly emerging disease by the International Institute Food Technology (17). The results of this study indicate that the infection rate of *F. hepatica* is significant and its potential for transmission and prevalence has remained stable in Ilam.

## Acknowledgements

We express our special thanks to Deputy of Research and Technology, Ilam University of Medical Sciences in collaboration with the approval of the project as well as officials and employees of the slaughter house, Veterinary Office, Ilam health networks and all those who collaborated in this study.

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